



Tip Series (# Flutes):
 18V (6 Flute Dovetail)
 45U (2 Flute Backdraft)
 48U (6 Flute Backdraft)

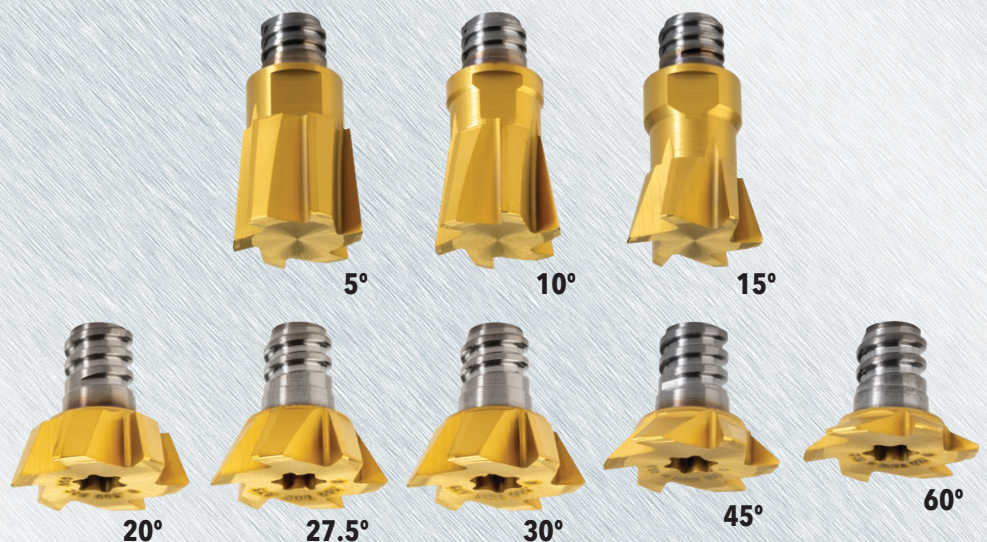
Diameter Range:
 .375" - 1.090"
 8-20mm

Corners
 .008" .015" .031" .062" .094" .125"
 .187" .250" .375" R
 0.2, 0.4, 0.5, 1.0, 1.5, 2.0,
 3.0, 4.0 mm R
 Sharp corner and chamfers

Adaptions
 T5, T6, T8, T10, T12, T15, T21

Materials
 Steel, stainless steel,
 iron, hi-temp alloys & titanium

Angle Options:
 60°, 45°, 30°, 27.5°, 20°, 15°,
 10°, 5°

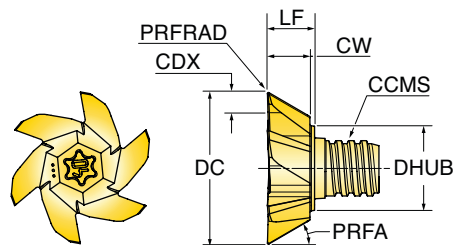
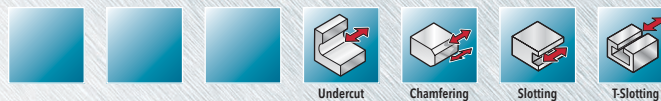


Backdraft & Dovetail tips for contour finishing, undercuts & angular forms

General Features:

- 6 flute dovetail tips are ideal for aerospace fixturing and pocket undercutting
- Compared to indexable, chip surfer dovetail offers 3x tool life and 200% higher feed rates!
- 2 flute backdraft perform best when finishing out corners of a pocket
- 6 flute backdraft blend precision with elevated productivity
- Solid carbide tips index on the shank in seconds and repeat within +/- .0005".



SOLID CARBIDE DOVETAIL TIP


Cutter Number	DC Cutting Diameter	PRFA Profile Angle	KAPR Cutting Edge Angle	PRFRAD Profile Radius	CW Cutting Width	CDX Cutting Depth Max	LF Functional Length	ZEFF Effective Flutes	CCMS Connection Code	DHUB Hub Diameter
18V-5006TQRA30	0.500	120.0	60.0	0.008	0.056	0.080	0.090	6	Chip Surfer T05	0.300
18V-5010TQRA45	0.500	90.0	45.0	0.008	0.086	0.080	0.130	6	Chip Surfer T05	0.300
18V-5016TQRA60	0.500	60.0	30.0	0.008	0.140	0.080	0.180	6	Chip Surfer T05	0.300
18V-5016TQRA63	0.500	55.0	27.5	0.008	0.154	0.080	0.180	6	Chip Surfer T05	0.300
18V-5016TQRA70	0.500	40.0	20.0	0.008	0.161	0.060	0.180	6	Chip Surfer T05	0.300
18V-5027T6RA75	0.500	30.0	15.0	0.008	0.270	0.070	0.650	6	Chip Surfer T06	0.360
18V-5040T6RA80	0.500	20.0	10.0	0.008	0.400	0.070	0.650	6	Chip Surfer T06	0.360
18V-5044T6RA85	0.500	10.0	5.0	0.008	0.430	0.040	0.650	6	Chip Surfer T06	0.360
NEW 18V13520TQRP45	0.531	90.0	45.0	0.008	0.079	0.070	0.120	6	Chip Surfer T05	0.300
NEW 18V13531TQRP60	0.531	60.0	30.0	0.008	0.122	0.070	0.150	6	Chip Surfer T05	0.300
NEW 18V16520T6RP45	0.650	90.0	45.0	0.008	0.079	0.070	0.120	6	Chip Surfer T06	0.360
NEW 18V16537T6RP60	0.650	60.0	30.0	0.008	0.146	0.080	0.170	6	Chip Surfer T06	0.360
NEW 18V19528T8RP45	0.768	90.0	45.0	0.008	0.110	0.100	0.150	6	Chip Surfer T08	0.453
NEW 18V19548T8RP60	0.768	60.0	30.0	0.008	0.189	0.110	0.240	6	Chip Surfer T08	0.453
NEW 18V22537T8RP45	0.886	90.0	45.0	0.008	0.146	0.140	0.180	6	Chip Surfer T08	0.453
NEW 18V22567T8RP60	0.886	60.0	30.0	0.008	0.264	0.150	0.300	6	Chip Surfer T08	0.453
NEW 18V25039TRRP45	0.984	90.0	45.0	0.008	0.154	0.150	0.200	6	Chip Surfer T10	0.600
NEW 18V25068TRRP60	0.984	60.0	30.0	0.008	0.268	0.150	-	6	Chip Surfer T10	0.600
18V27710TRRP75	1.090	30.0	15.0	0.008	0.398	0.090	0.460	6	Chip Surfer T10	0.600
18V27750TRRP45	1.090	90.0	45.0	0.008	0.197	0.160	0.230	6	Chip Surfer T10	0.600
18V27778TRRP60	1.090	60.0	30.0	0.008	0.307	0.160	0.340	6	Chip Surfer T10	0.600

When assembling, be sure tip is seated firmly on shank with no gap. No lubricant on adaption. Wrenches sold separately.

Series	CCMS Connection Code Machine Side	Torque Tightening (in/lbs)	 **OPTIONAL**	 **OPTIONAL**	 **OPTIONAL**	 **OPTIONAL**	 **OPTIONAL**	 **OPTIONAL**	 **OPTIONAL**	 **OPTIONAL**
			T-Handle Torx Driver	Torx Bit	Torx Drive L-Key	Adjustable Torque Wrench Handle	Torque Wrench Torx Bit Socket	Torque Wrench 90° Socket Adapter	Wrench	Torque Driver
18V-5006TQRA30	T05	60	DS-T20T	DS-T20B	DS-T20/3L	WRENCHTORQUES-50Nm9X12	DS-T2038SKT	DS-38SKT9X12	-	-
18V-5010TQRA45	T05	60	DS-T20T	DS-T20B	DS-T20/3L	WRENCHTORQUES-50Nm9X12	DS-T2038SKT	DS-38SKT9X12	-	-
18V-5016TQRA60	T05	60	DS-T20T	DS-T20B	DS-T20/3L	WRENCHTORQUES-50Nm9X12	DS-T2038SKT	DS-38SKT9X12	-	-
18V-5016TQRA63	T05	60	DS-T20T	DS-T20B	DS-T20/3L	WRENCHTORQUES-50Nm9X12	DS-T2038SKT	DS-38SKT9X12	-	-
18V-5016TQRA70	T05	60	DS-T20T	DS-T20B	DS-T20/3L	WRENCHTORQUES-50Nm9X12	DS-T2038SKT	DS-38SKT9X12	-	-
18V-5027T6RA75	T06	90	-	-	-	-	-	-	WS-0029	DT-90-08
18V-5040T6RA80	T06	90	-	-	-	-	-	-	WS-0029	DT-90-08
18V-5044T6RA85	T06	90	-	-	-	-	-	-	WS-0029	DT-90-08
18V13520TQRP45	T05	60	DS-T20T	DS-T20B	DS-T20/3L	WRENCHTORQUES-50Nm9X12	DS-T2038SKT	DS-38SKT9X12	-	-
18V13531TQRP60	T05	60	DS-T20T	DS-T20B	DS-T20/3L	WRENCHTORQUES-50Nm9X12	DS-T2038SKT	DS-38SKT9X12	-	-
18V16520T6RP45	T06	90	DS-T25T	DS-T25B	DS-T25L	WRENCHTORQUES-50Nm9X12	DS-T2538SKT	DS-38SKT9X12	-	-
18V16537T6RP60	T06	90	DS-T25T	DS-T25B	DS-T25L	WRENCHTORQUES-50Nm9X12	DS-T2538SKT	DS-38SKT9X12	-	-
18V19528T8RP45	T08	130	DS-T30T	DS-T30B	DS-T30/3L	WRENCHTORQUES-50Nm9X12	DS-T3038SKT	DS-38SKT9X12	-	-
18V19548T8RP60	T08	130	DS-T30T	DS-T30B	DS-T30/3L	WRENCHTORQUES-50Nm9X12	DS-T3038SKT	DS-38SKT9X12	-	-
18V22537T8RP45	T08	130	DS-T40T	DS-T40B	DS-T40/3L	WRENCHTORQUES-50Nm9X12	DS-T4038SKT	DS-38SKT9X12	-	-
18V22567T8RP60	T08	130	DS-T40T	DS-T40B	DS-T40/3L	WRENCHTORQUES-50Nm9X12	DS-T4038SKT	DS-38SKT9X12	-	-
18V25039TRRP45	T10	250	-	DS-T50B	DS-T50L	WRENCHTORQUES-50Nm9X12	DS-T5038SKT	DS-38SKT9X12	-	-
18V25068TRRP60	T10	250	-	DS-T50B	DS-T50L	WRENCHTORQUES-50Nm9X12	DS-T5038SKT	DS-38SKT9X12	-	-
18V27710TRRP75	T10	250	DS-T40T	DS-T40B	DS-T40/3L	WRENCHTORQUES-50Nm9X12	DS-T4038SKT	DS-38SKT9X12	-	-
18V27750TRRP45	T10	250	DS-T40T	DS-T40B	DS-T40/3L	WRENCHTORQUES-50Nm9X12	DS-T4038SKT	DS-38SKT9X12	-	-
18V27778TRRP60	T10	250	DS-T40T	DS-T40B	DS-T40/3L	WRENCHTORQUES-50Nm9X12	DS-T4038SKT	DS-38SKT9X12	-	-

SOLID CARBIDE BACKDRAFT TOROID TIP


Undercut



Facing



Shoulder



Channel



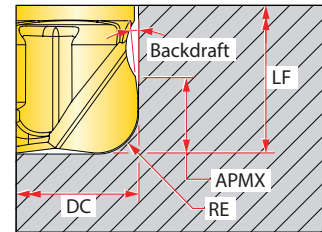
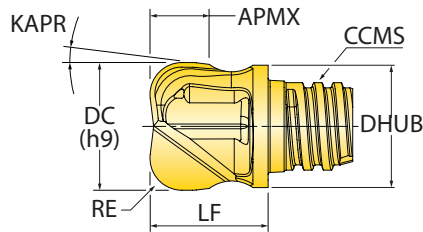
Ramp



Helical Interp.



Plunge


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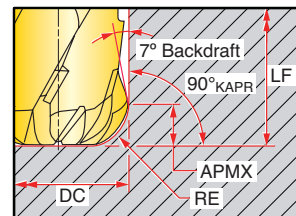
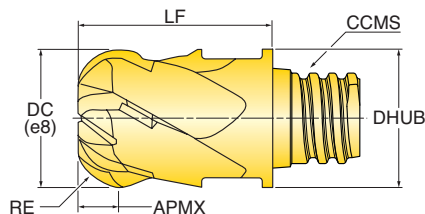
Cutter Number	DC Cutting Diameter	RE Corner Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	KAPR Cutting Edge Angle	CCMS Connection Code	DHUB Hub Diameter
45U-6231TRRA18	0.625	0.187	0.310	0.795	2	7	Chip Surfer T10	0.600
45U-7545TSRA31	0.750	0.312	0.445	0.680	2	7	Chip Surfer T12	0.726
45U-7545TSRA25	0.750	0.250	0.450	0.680	2	7	Chip Surfer T12	0.726

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Cutter Number	DC Cutting Diameter	RE Corner Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	KAPR Cutting Edge Angle	CCMS Connection Code	DHUB Hub Diameter
45U10006T6RA20	10.00 mm	2.00 mm	6.00 mm	12.40 mm	2.000	7.000	Chip Surfer T06	9.50 mm
45U10006T6RA30	10.00 mm	3.00 mm	6.00 mm	12.60 mm	2.000	7.000	Chip Surfer T06	9.50 mm
45U10008T6RA05	10.00 mm	0.50 mm	7.00 mm	12.45 mm	2.000	5.000	Chip Surfer T06	9.50 mm
45U10008T6RA10	10.00 mm	1.00 mm	7.00 mm	12.45 mm	2.000	5.000	Chip Surfer T06	9.50 mm
45U10008T6RA10	10.00 mm	1.00 mm	6.90 mm	11.20 mm	2.000	5.000	Chip Surfer T06	9.50 mm
45U12006T6RA30	12.00 mm	3.00 mm	5.40 mm	9.10 mm	2.000	7.000	Chip Surfer T06	9.10 mm
45U12006T6RA40	12.00 mm	4.00 mm	5.10 mm	9.10 mm	2.000	7.000	Chip Surfer T06	11.50 mm
45U12006T8RA10	12.00 mm	1.00 mm	6.00 mm	11.10 mm	2.000	7.000	Chip Surfer T08	11.50 mm
45U12006T8RA16	12.00 mm	1.60 mm	5.70 mm	11.10 mm	2.000	7.000	Chip Surfer T08	11.50 mm
45U12006T8RA20	12.00 mm	2.00 mm	5.90 mm	11.10 mm	2.000	7.000	Chip Surfer T08	11.50 mm
45U12006T8RA25	12.00 mm	2.50 mm	5.50 mm	11.10 mm	2.000	7.000	Chip Surfer T08	11.50 mm
45U12006T8RA30	12.00 mm	3.00 mm	5.50 mm	11.10 mm	2.000	7.000	Chip Surfer T08	11.50 mm
45U12006T8RA40	12.00 mm	4.00 mm	5.60 mm	11.10 mm	2.000	7.000	Chip Surfer T08	11.50 mm
45U16007TRRA20	16.00 mm	2.00 mm	7.20 mm	13.10 mm	2.000	7.000	Chip Surfer T10	15.20 mm
45U16007TRRA30	16.00 mm	3.00 mm	7.20 mm	13.40 mm	2.000	7.000	Chip Surfer T10	15.20 mm
45U16007TRRA40	16.00 mm	4.00 mm	7.10 mm	13.40 mm	2.000	7.000	Chip Surfer T10	15.20 mm
45U16008TRRA50	16.00 mm	5.00 mm	8.00 mm	20.20 mm	2.000	7.000	Chip Surfer T10	15.20 mm
45U20011TSRA30	20.00 mm	3.00 mm	10.80 mm	17.00 mm	2.000	7.000	Chip Surfer T12	18.45 mm
45U20011TSRA40	20.00 mm	4.00 mm	11.10 mm	17.30 mm	2.000	7.000	Chip Surfer T12	18.45 mm
45U20011TSRA50	20.00 mm	5.00 mm	11.10 mm	17.30 mm	2.000	7.000	Chip Surfer T12	18.45 mm
45U20011TSRA60	20.00 mm	6.00 mm	11.00 mm	17.30 mm	2.000	7.000	Chip Surfer T12	18.45 mm
45U20011TSRA80	20.00 mm	8.00 mm	10.90 mm	17.30 mm	2.000	7.000	Chip Surfer T12	18.45 mm

Series	CCMS Connection Code Machine Side	Torque Tightening (in/lbs)			
			OPTIONAL Wrench	**OPTIONAL** Torque Driver	
45U-6231TRRA18	T10	250	WS-0044	DT-250-08	
45U-7545TSRA31	T12	250	WS-0059	DT-250-09	
45U-7545TSRA25	T12	250	WS-0059	DT-250-09	
45U10006T6RA20	T06	90	WS-0029	DT-90-05	
45U10006T6RA30	T06	90	WS-0029	DT-90-05	
45U10008T6RA05	T06	90	WS-0029	DT-90-05	
45U10008T6RA10	T06	90	WS-0029	DT-90-05	
45U10008T6RA10	T06	90	WS-0029	DT-90-05	
45U12006T6RA30	T06	90	WS-0029	DT-90-05	
45U12006T6RA40	T06	90	WS-0029	DT-90-05	
45U12006T8RA10	T08	130	WS-0030	DT-130-07	
45U12006T8RA16	T08	130	WS-0030	DT-130-07	
45U12006T8RA20	T08	130	WS-0030	DT-130-07	
45U12006T8RA25	T08	130	WS-0030	DT-130-07	
45U12006T8RA30	T08	130	WS-0030	DT-130-07	
45U12006T8RA40	T08	130	WS-0030	DT-130-07	
45U16007TRRA20	T10	250	WS-0044	DT-250-08	
45U16007TRRA30	T10	250	WS-0044	DT-250-08	
45U16007TRRA40	T10	250	WS-0044	DT-250-08	
45U16008TRRA50	T10	250	WS-0044	DT-250-08	
45U20011TSRA30	T12	250	WS-0059	DT-250-09	
45U20011TSRA40	T12	250	WS-0059	DT-250-09	
45U20011TSRA50	T12	250	WS-0059	DT-250-09	
45U20011TSRA60	T12	250	WS-0059	DT-250-09	
45U20011TSRA80	T12	250	WS-0059	DT-250-09	

SOLID CARBIDE BACKDRAFT TOROID TIP



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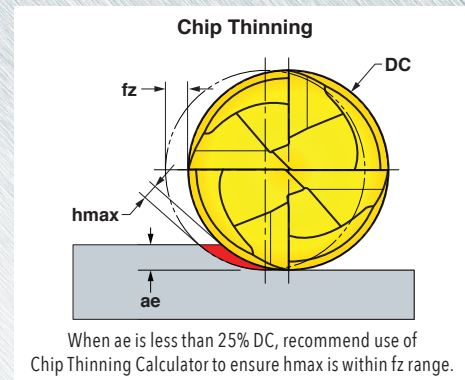
Cutter Number	DC Cutting Diameter	RE Corner Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter
48U-3719T6RB03	0.375	0.031	0.190	0.500	6	30	Chip Surfer T06	0.364
48U-3719T6RB06	0.375	0.062	0.190	0.484	6	30	Chip Surfer T06	0.364
48U-3719T6RB12	0.375	0.125	0.190	0.510	6	30	Chip Surfer T06	0.364
48U-5027T8RB03	0.500	0.031	0.270	0.630	6	30	Chip Surfer T08	0.480
48U-5027T8RB06	0.500	0.062	0.270	0.650	6	30	Chip Surfer T08	0.480
48U-5027T8RB12	0.500	0.125	0.270	0.630	6	30	Chip Surfer T08	0.480
48U-6235TRRB20	0.625	0.200	0.350	0.800	6	30	Chip Surfer T10	0.600

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Cutter Number	DC Cutting Diameter	RE Corner Radius	APMX Depth of Cut Max.	LF Functional Length	ZEFF Effective Flutes	FHA Flute Helix Angle	CCMS Connection Code	DHUB Hub Diameter
48U08004QRB20	8.000	2.000	4.000	10.000	6	30	Chip Surfer T05	5.900
48U10005T6RB30	10.000	3.000	5.000	13.000	6	30	Chip Surfer T06	7.900
48U12007T8RB40	12.000	4.000	7.000	16.500	6	30	Chip Surfer T08	9.900
48U16009TRRB50	16.000	5.000	9.000	20.500	6	30	Chip Surfer T10	12.900

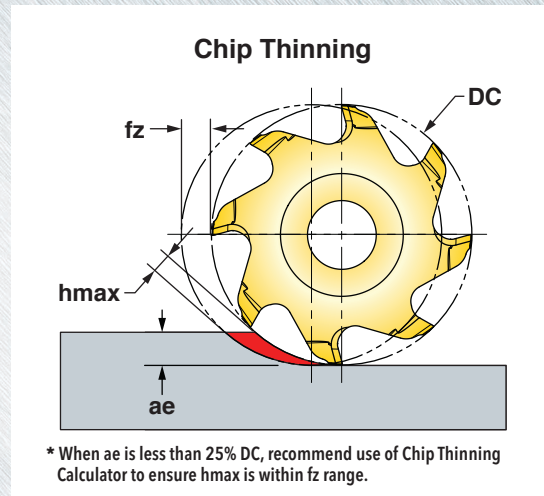
CHIP SURFER™ 48U HARDWARE

Series	CCMS Connection Code Machine Side	Torque Tightening (in/lbs)	 **OPTIONAL** Wrench	 **OPTIONAL** Torque Driver	
48U-3719T6RB03	T06	90	WS-0029	DT-90-08	
48U-3719T6RB06	T06	90	WS-0029	DT-90-08	
48U-3719T6RB12	T06	90	WS-0029	DT-90-08	
48U-5027T8RB03	T08	130	WS-0030	DT-130-10	
48U-5027T8RB06	T08	130	WS-0030	DT-130-10	
48U-5027T8RB12	T08	130	WS-0030	DT-130-10	
48U-6235TRRB20	T10	250	WS-0044	DT-250-13	
48U08004QRB20	T05	60	WS-0043	DT-60-06	
48U10005T6RB30	T06	90	WS-0029	DT-90-08	
48U12007T8RB40	T08	130	WS-0030	DT-130-10	
48U16009TRRB50	T10	250	WS-0044	DT-250-13	



Materials				Vc Cutting Speed SFM	fz Feed/Tooth (inch)	Coolant
ISO	Mat'l Group	Type	Examples			
P	1-5	Non-alloy Steel	1018, A36, 1045, A572, 1070	350-600	.002-.004	No
	6-9	Low-alloy Steel	4140, 4340, P20, 8620, 300M			
	10-11	High-alloy Steel	H13, A2, D2, M2, T1	300-500		
M	12-13	Stainless Steel (Ferritic & Martensitic)	410, 416, 440	250-500	.002-.004	Yes
	14	Stainless Steel (Austenitic)	303, 304, 316, 15-5, 17-4			May not be required at high speeds
K	15-16	Gray Cast Iron	CLS. 20, 30, 45	450-700	.003-.005	No
	17-20	Nodular Cast Iron	60-40-18, 100-70-03	400-600	.003-.004	
S	31-35	High-Temp Alloys	Inconel, Hastelloy, Nimonic, Monel	75-125	.002-.004	Yes
	36-37	Titanium Alloys	6Al-4V, 5Al-5Mo-5V-3Cr	125-200		

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.



Materials				Full Slot 		Side Cut 		Coolant
ISO	Mat'l Group #VDI 3323	Type	Examples	Vc Cutting Speed SFM	f_z^* Feed/Tooth (inch)	Vc Cutting Speed SFM	f_z^* Feed/Tooth (inch)	
P	1 thru 5	Non-alloy Steel	1018, A36, 1045, A572, 1070	300-400	.001-.004	450-650	.002-.005	No
	6 thru 9	Low-alloy Steel	4140, 4340, P20, 8620, 300M	300-400		450-650		
	10, 11	High-alloy Steel	H13, A2, D2, M2, T1	250-350		400-600		
M	12 thru 13	Stainless Steel (Ferritic & Martensitic)	410, 416, 440	200-450	.001-.004	250-550	.002-.005	Yes
	14	Stainless Steel (Austenitic)	303, 304, 316, 15-5, 17-4					May not be required at high speeds
K	15 thru 16	Gray Cast Iron	CLS. 20, 30, 45	400-700	.001-.005	500-800	.002-.006	No
	17 thru 20	Nodular Cast Iron	60-40-18, 100-70-03					
N	21-30	Aluminum	7075, 6061	1000-2000	.002-.006	1000-3000	.002-.007	Yes
S	31 thru 35	High-Temp Alloys	Inconel, Hastelloy, Nimonic, Monel	65-125	.001-.004	65-150	.002-.004	Yes
	36 thru 37	Titanium Alloys	6Al-4V, 5Al-5Mo-5V-3Cr					

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

Step 1: Screw tip into shank until finger tight (Figure 1a). Note a .010" gap (Figure 1b).

Step 2: Use wrench to torque approximately 1/4 turn, creating a simultaneous fit (Figure 2).

Step 3: Use .001" shim stock to check the simultaneous fit at the intersection of the tip and the shank.

The shim should not be able to enter the intersection (Figure 3a).

If it does, tighten further with the wrench until there is no gap (Figure 3b).

Note: Torque wrenches can be purchased.

Figure 1a. Finger tight



Figure 1b. .010" gap



Figure 2. 1/4 turn



Figure 3a. Shim should NOT enter intersection



Figure 3b. Proper fit



Optional Torque Wrench

